

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P10759PCT	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/US 02/ 22314	International filing date (day/month/year) 12/07/2002	(Earliest) Priority Date (day/month/year) 14/08/2001
Applicant  INTEL CORPORATION		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 5 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

**4. With regard to the title,**

the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

**5. With regard to the abstract,**

the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

**6. The figure of the drawings to be published with the abstract is Figure No.**

as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.

**2a, 2b**

None of the figures.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 02/22314

## Box III TEXT OF THE ABSTRACT (Continuation of item 5 of the first sheet)

Apparatus and method for treating a surface of a substrate for electrolytic or electroless plating of metals in integrated circuit manufacturing. In one embodiment the method includes forming a barrier layer(16) on a substrate. A metal-seed layer(17) is then formed on the barrier layer. The method continues by performing in situ surface treatment of the metal-seed layer(17) to form a passivation layer(18) on the metal-seed layer. In another embodiment of a method of this invention, a substrate is provided into an electroplating tool chamber. The substrate has a barrier layer formed thereon, a metal seed layer formed on the barrier layer and a passivation layer formed over the metal seed layer. The method continues by annealing the substrate in forming gas to reduce the passivation layer(18). A conductive material is deposited on the substrate using an electrolytic plating or electroless plating process.

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/22314

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 H01L21/768 H01L21/288

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data, INSPEC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 037 258 A (LIU CHUNG-SHI ET AL) 14 March 2000 (2000-03-14) the whole document ---	1,2,5-8, 11,28-30
X	WO 01 24257 A (LAM RES CORP) 5 April 2001 (2001-04-05) Y page 5, line 7 -page 9, line 3 page 10, line 16 -page 11, line 26; figures 2A,C,3A ---	1,2,4-7, 13 14,15, 19-24
X	WO 99 63590 A (APPLIED MATERIALS INC) 9 December 1999 (1999-12-09) A page 5, line 14 -page 9, line 37; figures 2A-D --- -/--	1,2,5-7 14,19,22

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

## ° Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*G\* document member of the same patent family

Date of the actual completion of the international search

25 March 2003

Date of mailing of the international search report

04/04/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.  
Fax: (+31-70) 340-3016

Authorized officer

Micke, K

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/22314

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 159 857 A (LIU CHUNG-SHI ET AL) 12 December 2000 (2000-12-12) column 3, line 5 - line 47; figure 2 ---	14,15, 19-24
A	US 5 918 150 A (MAA JER-SHEN ET AL) 29 June 1999 (1999-06-29) column 4, line 46 -column 8, line 64 column 9, line 54 -column 10, line 9 column 10, line 38 - line 41; figures 1-3,8,9 ---	1,2,4-7
P,X	US 6 395 642 B1 (LIU CHUNG-SHI ET AL) 28 May 2002 (2002-05-28)  column 5, line 45 -column 6, line 31; claims 1,6; figure 2BC -----	1,2,4-7, 13,14, 20-23, 28-30

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 02/22314

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6037258	A	14-03-2000	NONE	
WO 0124257	A	05-04-2001	US 2002063062 A1 EP 1216486 A1 TW 469585 B WO 0124257 A1 US 2002175071 A1	30-05-2002 26-06-2002 21-12-2001 05-04-2001 28-11-2002
WO 9963590	A	09-12-1999	US 6319728 B1 EP 1084513 A1 JP 2002517901 T WO 9963590 A1	20-11-2001 21-03-2001 18-06-2002 09-12-1999
US 6159857	A	12-12-2000	NONE	
US 5918150	A	29-06-1999	JP 10116831 A	06-05-1998
US 6395642	B1	28-05-2002	NONE	